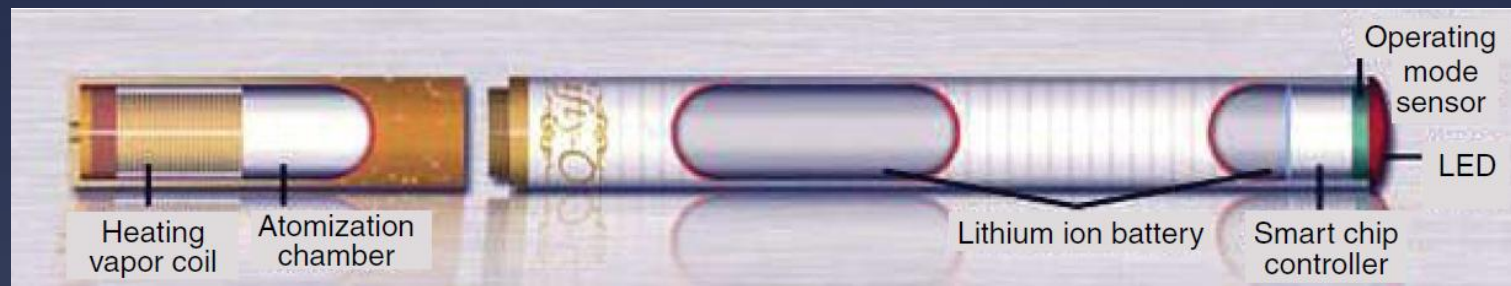


# Electronic Cigarettes

## Potential Harms & Benefits

Dona Upson, MD, MA  
UNM/ NMVAHCS  
11/20/13

# Devices that deliver a nicotine-containing vapor



# FDA Regulation

- \* FDA-approved and regulated nicotine inhalers deliver non-combusted aerosolized nicotine, absorbed in the oropharyngeal mucosa.
- \* E-cigarettes – heating element atomizes the liquid, resulting in aerosolized nicotine vapor and a visible plume. This vapor is inhaled into the lungs - termed “vaping” - where nicotine is subsequently absorbed.
- \* E-cigarettes currently lack FDA oversight – lack of standardized production, marketing and safety assessments.
- \* Anticipated that the FDA will regulate e-cigarettes as tobacco products, not as a tool for the treatment of tobacco dependence,

# Implications for lung health

- \* Marketed and perceived as a “healthier alternative” to conventional cigarettes.
- \* Few data exist regarding the safety of these devices and efficacy in harm reduction and treatment of tobacco dependence.
  - \* Studies limited by small sample sizes, lack of control groups and significant loss to follow-up.
- \* Even less is known about their overall impact on population health.

# Vapor

- \* Variable amounts of nicotine and potentially harmful toxins, albeit at levels lower than in conventional cigarette smoke.
  - \* A study of 16 different e-cigarettes found that the total amount of nicotine in 15 puffs of vapor generated by an automatic smoking machine varied from 0.5-15.4 mg.
  - \* Typical amount from one smoked conventional cigarette ranges from 1.54 to 2.60 mg.
- \* FDA has detected low levels of toxic substances in e-cigarettes:
  - \* Tobacco specific nitrosamines and diethylene glycol
  - \* 4 carbonyl compounds and 2 volatile organic compounds
  - \* Heavy metals – lead, cadmium, nickel.
- \* Long-term carcinogenic effects are not known.

# Lung function

- \* Additives in the liquid nicotine cartridge (glycol derivatives) are similar to theatrical smokes and fogs.
- \* Acute exposure to propylene glycol for one minute in 27 healthy non-asthmatics resulted in a 2% reduction in  $FEV_1/FVC$  ( $p=0.049$ ) – measure of airway obstruction.
- \* In a longitudinal study of 101 employees working at sites using theatrical fog, those usually working  $\leq 10$  feet from fog-generating machines had 5% reductions in adjusted  $FEV_1$  and FVC compared with those working further away.

# Lung function

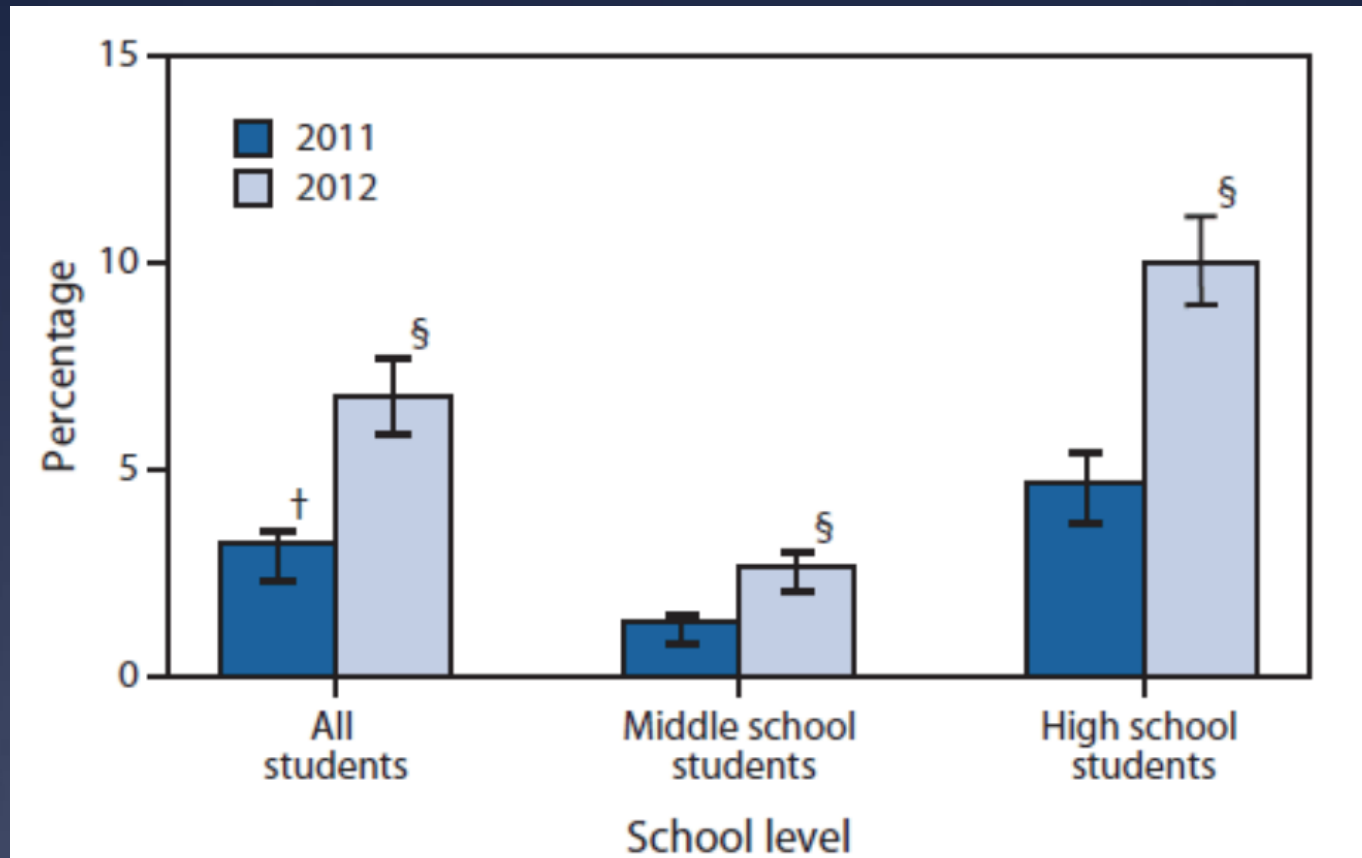
- \* Increased airway obstruction
  - \* In a recent study of 30 healthy smokers, use of e-cigarettes for 5 minutes resulted in increased total respiratory impedance, respiratory flow resistance and overall peripheral airway resistance.
- \* E-cigarette use was associated with increasing oxidative stress as measured by lower levels of the fraction of exhaled nitric oxide.
- \* Generate smaller acute effects on lung function than conventional cigarettes.
- \* Long-term effects on lung function are not known.

# Role in harm reduction is unclear

- \* Some data demonstrate that electronic cigarettes may be effective in reducing conventional cigarette consumption.
- \* No data demonstrating the efficacy of electronic cigarettes as a tool to achieve cessation.
- \* Recent study by the federal Tobacco-Related Disease Research Program found that instead of quitting, more people are moving toward dual use.
  - \* They may cut down on their regular cigarette use but they're not quitting and they're adding e-cigarettes into the mix.
  - \* No cardiovascular benefit without total cessation.
  - \* Heart disease leading cause of death among smokers.



# Use of e-cigarettes among US middle & high school students more than doubled last year



Ever electronic cigarette use among middle and high school students, by year — National Youth Tobacco Survey, United States, 2011–2012  
CDC MMWR – September 6, 2013 / 62(35);729-730

# Not only used by smokers

- \* Concern that electronic cigarettes may serve as a gateway to conventional cigarettes.
- \* In 2012, 20.3% of middle school, and 7.2% of high school, ever e-cigarette users reported never smoking conventional cigarettes.
- \* Among current e-cigarette users, 61.1% and 80.5%, respectively, reported current conventional cigarette smoking.
- \* An estimated 160,000 students who reported ever using e-cigarettes had never smoked conventional cigarettes.

# Nicotine addiction

- \* Possible role of e-cigarettes in establishing nicotine addiction, especially in youth.
- \* Nicotine has a negative impact on adolescent brain development, and on development of the fetal brain, with implications for use during pregnancy.
- \* Nicotine causes constriction of blood vessels; leads to low birth weight babies, who are at increased risk of illness & death.
- \* May help perpetuate nicotine dependence in those who smoke conventional cigarettes, and decrease incentives for cessation because they can be used where conventional cigarettes are not allowed.
  - \* Recent study: 28.3% of people who use e-cigarettes regularly do so because they are allowed in places where smoking is banned.

# Companies claim they do not market to youth



Flavors include cherry, strawberry, vanilla, cookies & cream milkshake and more.

Vapor Level	Outstanding	Excellent	Very Good	Excellent	Outstanding
Choice of Nicotine Level	5 strengths 0-24mg	5 strengths 0-24mg	4 strengths 0-16mg	5 strengths 0-24mg	5 strengths 0-24mg
Choice of tobacco flavors	Three	Two	Two	Three	Three
Choice of Fruit Flavors	No fruit flavors	Peach,Pineapple Pear, Orange, Apple, Cherry, Strawberry, Watermelon, Blueberry, Grape	Cherry,Apple, Grape, Banana, Orange,Peach, Pineapple, Strawberry, Blueberry, Watermelon,	Cherry, Pina Colada, Peach	Cherry
Choice of Other Flavors	Chocolate, Mocha, Vanilla, Menthol, Clove	Menthol,Vanilla, Chocolate,Coffee, Clove, RedEnergy,Cola, Caramel, Irish Cream	Menthol,Mild Menthol, Vanilla, Almond, Chocolate, Peppermint Cinnamon, Clove Coffee	Chocolate, Vanilla, Menthol, Peppermint,	Menthol, Peppermint, Coffee, Vanilla, Chocolate, Cherry, Cola Mint Tea Pumpkin Spice (seasonal)
Battery Colors	White, Pink, designer styles	White, choice of colors and patterns; custom designs	White	White or Black	White, Black, Stainless Steel, Blue,Pink VC Slims
Battery length (without filter cartridge)	Standard 2.5", Long- 3.2"	Standard 2.5", Long- 4.2"	Standard or 4"	Standard 2.5", Long 3.25"	Shorty-2.63" Standard- 3.11" Long-4.4"

# Youth-oriented ads



- \* <http://www.youtube.com/watch?v=mUJ5W2pz1XI>
- \* <http://www.youtube.com/watch?v=grWEhJ63OQ0>
- \* [http://www.youtube.com/watch?v=zvUFgVxs\\_7k](http://www.youtube.com/watch?v=zvUFgVxs_7k)
- \* <http://www.youtube.com/watch?v=gqC5lg74xhY>





- \* British American Tobacco has apologized for running an ad for its Vype e-cigarette in an Ipad game aimed at children.
- \* The ad drew attention after GB, a UK-based author, tweeted a picture.
- \* It's not clear how the ad ended up in the game.
- \* BAT: We apologise that an advert has ended up on an channel that it clearly wasn't intended or appropriate for. As soon as this was brought to our attention, we pulled all our online advertising whilst we look into this matter further and establish how it happened.

# Most major US & European tobacco companies have invested heavily in the e-cigarette market


- \* Industry advertising spending increased to \$20.8 million in 2012, from \$2.7 million in 2010.
- \* At this year's Super Bowl, an ad for NJoy e-cigarettes generated a 40% increase in sales in the 5 markets where it aired.
- \* Studies by the U.S. attorney general found that e-cigarette sales have doubled every year since 2008, with sales expected to reach \$1.7 billion in 2013.
- \* The percentage of US adult smokers trying e-cigarettes increased from 10% in 2010 to 21% in 2011.



# Changing social norms

- \* Concern that e-cigarette marketing, ads and use re-normalize and re-glamorize smoking.
  - \* Potentially reversing decades of efforts by the public health and medical community.
- \* Any potential benefits related to cessation or reduction of conventional cigarette smoking due to e-cigarette use by individuals could be outweighed by an overall societal increase in nicotine dependence associated with e-cigarette initiation, and with a renewed acceptance of smoking in general.


# Good job DOH!




Quit Smoking Now - Free  
Free Patches w/ Your Personal Plan Call 1-800-QUIT NOW  
[www.QuitNow.net/NewMexico](http://www.QuitNow.net/NewMexico)  
Ads by Google

0:57 / 8:32


E-Cigarettes



**1-800-QUIT NOW**  
NEW MEXICO  
DEPARTMENT OF  
**HEALTH**



**Balding Celebrity Secrets**  
by Caboki  
2,137,995 views  
Ad



**REVIEW OF THE ORION V2 ELECTRONIC CIGARETTE**  
by igetcha69  
86,510  
FEATURED

# Future

- \* States can include e-cigarettes with all their tobacco regulation.
  - \* They are legally tobacco products.
- \* Need research evaluating the efficacy and health implications of electronic cigarettes, to determine if they reduce, or reinforce smoking behaviors.
- \* Strong recommendations from medical and health associations, including the American Thoracic Society, to regulate e-cigarettes the same as conventional cigarettes.

# Recent resource

- \* Seminar from University of California 10/2013  
available at <http://www.trdrp.org/event-link.php>